

Claims

1. An optical correlator having an image production device, an image capture
5 device and an optical device for providing a Fourier transform of image
information on the image production device at the image capture device, wherein
the image production device and image capture device are disposed in a common
plane.
- 10 2. An optical correlator according to Claim 1, wherein the image production
device and the image capture device are integrated on a common substrate.
3. An optical correlator according to Claim 1 or 2, wherein the image
production device has plural image production elements, the image capture device
15 has plural image capture elements and the image capture elements are interspersed
with the image production elements.
4. An optical correlator according to Claim 1 or 2, wherein the image
production device has plural image production elements, the image capture device
20 has plural image capture elements and each image production element includes an
image capture element.
5. An optical correlator according to Claim 1 or 2, wherein the image
production device and the image capture device are spatially separate.
- 25 6. An optical correlator according to any preceding claim, wherein the
optical device comprises at least one positive power optical device arranged to
receive light from the image production device and to pass light back to the image
capture device.

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7. An optical correlator according to Claim 6, wherein the positive power optical device comprises a curved mirror.
- 5 8. An optical correlator according to Claim 6, wherein the positive power optical device comprises a planar mirror and a positive power lens.
9. An optical correlator according to any preceding claim, having circuitry for applying reference image data to one part of the image production device, and
10 circuitry for providing reference scene data to another distinct part of the image production device.
10. An optical correlator according to any preceding claim, wherein the image production device is operable to provide phase modulation of incident light
15 according to applied image data.
11. An optical correlator according to Claim 10, wherein the image production device has two output levels only.
- 20 12. An optical correlator according to any preceding claim, wherein the image production device comprises a ferroelectric liquid crystal on silicon spatial light modulator.
13. An optical correlator according to any one of Claims 1 to 12, wherein the
25 image production device comprises one from the group comprising a nematic liquid crystal on silicon spatial light modulator, a pi-cell spatial light modulator and a microelectromechanical systems (MEMS) spatial light modulator.
14. A pixellated image capture device for a joint transform correlator, the
30 capture device being constructed and arranged to provide an electrical signal per

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pixel representative of the quantity of light received at the pixel wherein the image capture device is integrated on a silicon substrate, and the integrated device further comprises processing circuitry constructed and arranged to compare the electrical signal of each pixel of the image capture device against a threshold, and
5 to provide an output signal per pixel in accordance with the comparison result.

15. A pixellated image capture device according to claim 14, wherein the threshold is formed from the electrical signals of at least one pixel adjoining the said pixel.

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16. A pixellated image capture device according to claim 14 or 15, comprising a pixellated image production device, wherein the processing circuitry is constructed and arranged to provide each output signal per pixel to a respective pixel of the image production device.

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17. A pixellated image capture device according to claim 16, having output circuitry for reading out unprocessed information from each pixel of the image capture device.

20 18. A pixellated image capture device according to claim 16 or 17, wherein the pixellated image production device is integrated on the same substrate as the image capture device.

19. A method of correlating at least one input image with at least one reference
25 image, the method comprising:-

illuminating a representation of the or each input image and the or each reference image with coherent light to provide a first light beam; and,
passing the first light beam to an optical device disposed to provide a second image at a plane, the second image being a Fourier transform of the or each input
30 image and reference images,

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wherein the second image is formed co-planar with the representation of the or each input image and reference image.

19. An integrated circuit comprising a liquid crystal on silicon spatial light
5 modulator and an image capture device, the spatial light modulator having an
array of light modulating elements and the image capture device having an array
of light capture elements, wherein each light capture element is arranged to
provide an output representative of the light picked up by the respective capture
element, the integrated circuit further having processing circuitry for each capture
10 element constructed and arranged to process the output of the said capture element
together with the output of at least a respective one other capture element and to
provide a first output from each capture element in response to such processing,
the capture array further having output circuitry for outputting the unprocessed
output of each capture element.

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